IN THE SPECIFICATION:

On page 1, before line 1, please add the following new paragraph:

-- Cross Reference to Related Application

This application is a divisional of U.S. Application Serial No. 09/975,362, filed October 11, 2001. --

Please amend the paragraph beginning on page 1, line 15, as follows:

Related patent application

"Architecture for an Optical Network Manager" (Emery et al.) SN ~~not yet available,~~ provisional patent application filed ~~on~~ June 13, 2001, ~~docket 1009~~ SN 60/298,008; formal US patent application "Network Operation System with Topology Autodiscovery" (Emery et al) SN 10/163,939, filed June 6, 2002, Docket 1015US.

Please amend the paragraph beginning on page 2, line 18, as follows:

The present invention is applicable to a wavelength switched network where each signal travels between a different source and destination node, without unnecessary OEO conversions at all intermediate nodes. The present specification is concerned with the line amplification system of such a network, that is generally described in the co-pending patent applications "Architecture for a Photonic transport Network" (Roorda et al.), SN 09/876,391, filed on June 8, 2001. The present invention is also concerned with a line control system generally described in the patent application "Method for Engineering connections in a dynamically Reconfigurable Photonic Switched Network" (Zhou et al.), provisional patent application filed July 18, 2001, SN 60/306,302, formal patent application filed August 2001, SN not available yet, docket 1010. This patent application claims priority from both above-mentioned patent applications. Details about the software architecture and operation of this photonic network are also described,

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illustrated and claimed in co-pending ~~provisional patent application "Architecture for an Optical Network Manager" (Emery et al.), SN not yet available, filed on June 13, 2001,~~ <u>above referenced patent application Docket 1015US</u> which is incorporated herein by reference.

Please amend the paragraph beginning on page 11, line 9, as follows:

Figure 2A shows an example of a path for a channel λ originating at flexibility site **A** and terminating at flexibility site **D**. Besides a preamplifier ~~**6**~~ <u>8</u> and a post-amplifier **9**, a flexibility site comprises a switch WXC as shown for site **B**, or an OADM as shown for site **D**, an access system **70** and an electro-optics system **80**. The access system **70** de/multiplexes the channels dropped/added at the respective node, and the electro-optics **80** performs optical-to-electrical conversion for the dropped channels, and/or the electrical-to-optical conversion for added channels. The electro-optics system **80** comprises the transponders with the long-reach transmitters and receivers, and a pool of regenerators that may be assigned to any channel passing though the node, and that needs regeneration. For this example, it is assumed that the signal travels in optical format between terminal nodes **A** and **D**, without OEO conversion at any of the intermediate flexibility sites **B** and **C**.

Please amend the paragraph beginning on page 11, line 29, as follows:

Figure 2B shows an optical line amplifier **7**, which comprises in general, for one direction of traffic, a Raman amplification unit **10** and a mid-stage access EDFA unit **20** for the forward direction (West to East). Figure 2B also shows a multiplexed over the reverse fiber **5'** by WDM coupler **17'** at Raman unit **10**.~~,~~ In fact, the output WDM signal on a reverse line is passed through a Raman unit **10** for the forward direction (and vice-versa) for taking advantage of the access to the OSC provided on this unit. This is better shown on Figures 2A and 2B, where the output of stage **22'** is routed over to the Raman unit **10**, and on Figure 2C for a flexibility site, where the output of booster **9'** is routed over to the Raman unit **10**.

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Please amend the paragraph beginning on page 17, line 8, as follows:

The bidirectional OSC, decoupled at the Raman unit **10** is passed to the shelf network processor **40** using a transmitter/receiver pair denoted with **16**. Raman unit provides access to ~~OSA 30~~ OSC 30 for both Westbound and Eastbound directions at taps **35**. The taps are used in the span control loop, as described later, which controls, among other parameters, the pumps **11** based on a target gain. This gain can be fixed, but is preferably not: a fixed gain limits the application of the hardware configuration to a small range of fiber losses, because of the gain tilt induced in the EDFAs in the line.

Please amend the paragraph beginning on page 26, line 28, as follows:

The model **96** is set using a plurality of measurements obtained during system installation and testing and measurements collected and updated with each new measurement. For example, the model may use constants from engineering tool, constants from components, design constants, measured values during installation, modes and operating range of each mode, alarm conditions. The model (and the control signal) is updated with each iteration of the measurements~~, the model and the measurements~~. The rules block **95** can also be instructed to add/remove a wavelength.

Please amend the paragraph beginning on page 28, line 12, as follows:

As seen above, each loop gathers information from the optical modules and the OSAs **30** in the line, which originates from the respective amplifier unit **6** at the end of a span. Control rules block **95** allows extending the concept of 'span' to a 'super-span', shown in Figure 6D. Each composite span loop **5-1, 5-2** and **5-3** of Figure 6D encompasses a first type and a second type amplifier **7** and respectively **8** (amplifier **8** is not shown for composite loop 5-1), and a respective OSA **30-1, 30-2, 30-3** for providing power and spectrum measurements at the site of the amplifier **7**. As mentioned, an amplifier **8** is not able to adjust the spectrum of

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the WDM signal, as it is not provided with a DGE **23**, so that it is controlled from the site of the amplifier **7**.

Please amend the sub-paragraph beginning on page 31, line 10, as follows:

For example, if the mean span loss is 23dB and the maximum allowable Raman gain is 15 dB, for an actual loss of 20dB, the set Raman gain is 12 dB.

Please amend the paragraph beginning on page 32, line 6, as follows:

The modified rules could for example be shown in EQ2:

G_raman = G_raman_max - (Mean_span_loss - Actual_span) + Offset
If G_raman > G_raman_max, THEN ~~G-raman~~ G raman = G_raman_max

EQ2

Please amend the paragraph beginning on page 32, line 11, as follows:

For example, if the mean span loss is 23 dB and the maximum allowable Raman gain is 15 dB for an actual span loss of 20dB, the set Raman gain is 12 dB. But if the offset is set at 2dB, then the set Raman gain is 14 dB. This will increase the average performance at the impact of reach to some wavelengths (i.e. reduced capacity).

Please amend the paragraph beginning on page 32, line 16, as follows:

Figures 9A-9C show performance changes for offset values of 1 to 3 dB. Thus, the invention provides the line control system with a flexible control of the Raman assisted amplified line systems, where by means of the control system alone the reach versus capacity can be optimized for a particular implementation and requirement. This minimizes inventory and increases the number of accessible networks with a single system design.

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